

(19) World Intellectual Property
Organization
International Bureau



06 DEC 2004



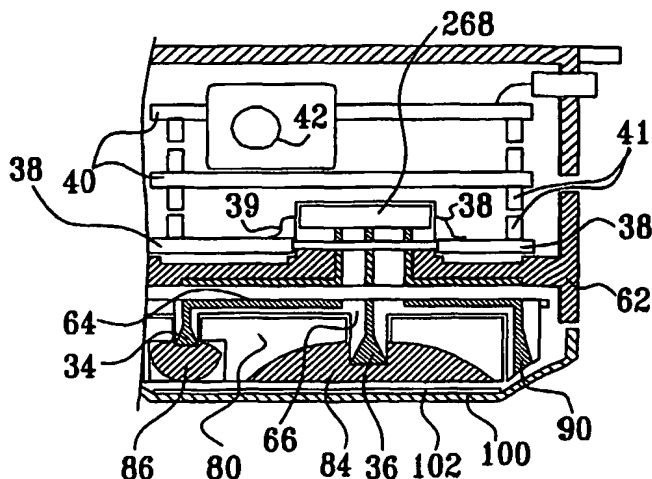
(43) International Publication Date
18 December 2003 (18.12.2003)

PCT

(10) International Publication Number
WO 2003/104833 A3

- (51) International Patent Classification⁷: **H01Q 13/02** (74) Agents: **SANFORD T. COLB & CO.** et al.; P.O. Box 2273, 76122 Rehovot (IL).
- (21) International Application Number: **PCT/IL2003/000472** (81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (22) International Filing Date: **4 June 2003 (04.06.2003)**
- (25) Filing Language: **English**
- (26) Publication Language: **English**
- (30) Priority Data: **60/386,893** **6 June 2002 (06.06.2002)** **US** (84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
- (71) Applicant (*for all designated States except US*): **ROAD-EYE FLR GENERAL PARTNERSHIP [IL/IL]**; 12 Hanapach Street, P.O. Box 6362, 20101 Karmiel (IL).
- (72) Inventors; and
- (75) Inventors/Applicants (*for US only*): **HARTZSTEIN, Claudio [FR/IL]**; 30/1 Hahayl Street, 43317 Ra'anana (IL). **LEVY, Aharon [IL/IL]**; 13 Gush Halav Street, 27072 Kiryat Bialik (IL). **ADAR, Daniel [IL/IL]**; 82 Baz Street, 21721 Karmiel (IL). **ANDERMAN, Hanan [IL/IL]**; 14 Keshet Street, 48611 Rosh Haayin (IL). **SHAPIRA, Gil [IL/IL]**; 8 Netzah Yisrael Street, 64352 Tel Aviv (IL). **FISHLER, Ehud [IL/IL]**; 4/D Bosmat Street, 73142 Shoham (IL). **BITTON, Ilan [IL/IL]**; 4 Noga Street, 34407 Haifa (IL). **SHMUEL, Amir [IL/IL]**; 78 HaGalil Street, 36001 Nofit (IL).
- Published:
— *with international search report*
— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*
- (88) Date of publication of the international search report:
13 May 2004
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

(54) Title: **FORWARD-LOOKING RADAR SYSTEM**



(57) Abstract: An assembly for receiving and transmitting millimeter (mm) waves, including at least one mm wave reflector (84, 86, 88) and at least one mm transmission wave feed (72) configured in a transmission feed location (34) within the at least one mm wave reflector. The assembly also includes a plurality of receiving mm wave feeds (72) configured in respective receiving feed locations (36) within the at least one mm wave reflector; and a radio frequency (RF) module (38). The RF module is coupled to the at least one mm transmission wave feed and to the plurality of the receiving mm wave feeds, so as to drive the at least one mm transmission wave feed to transmit outgoing mm waves and to simultaneously receive incoming mm waves from all of the plurality of the receiving mm wave feeds.

WO 2003/104833 A3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/IL03/00472

A. CLASSIFICATION OF SUBJECT MATTERIPC(7) : H01Q 13/02
US CL : 343/775, 779

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 343/711, 713, 772, 775, 779

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
noneElectronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EAST text search and EAST image search**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	US 5,606,737 A (SUZUKI et al) 25 February 1997 (25.02.1997), see entire document.	1, 4, 5, 25, 28 and 29 ----- 2, 3, 26, 27
X --- Y	US 5,825,333 A (KUDOH et al) 20 October 1998 (20.10.1998) see entire document.	1, 4, 5, 25, 28 and 29 ----- 2, 3, 26 and 27

☐ Further documents are listed in the continuation of Box C.☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T"

later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X"

document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y"

document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&"

document member of the same patent family

Date of the actual completion of the international search

25 February 2004 (25.02.2004)

Date of mailing of the international search report

08 APR 2004

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Facsimile No. (703) 305-3230

Authorized officer

for Ian J. Lobo *S. Brown*
Telephone No. (703) 306-4161

INTERNATIONAL SEARCH REPORT

International application No.

PCT/IL03/00472

Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claim Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claim Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claim Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:
Please See Continuation Sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.: 1-5 and 25-29

Remark on Protest

☐
☐

The additional search fees were accompanied by the applicant's protest.

No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

PCT/IL03/00472

BOX II. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claim(s) 1-5 and 25-29, drawn to a transmitter/receiver assembly.

Group II, claim(s) 6, 7, 30, 31 and 46-48, drawn to an antenna system mount and sub assembly.

Group III, claim(s) 8, 9, 32 and 33, drawn to a radome.

Group IV, claim(s) 10, 11, 34 and 35, drawn to a vehicle mounted transceiver.

Group V, claim(s) 12-18 and 36-42, drawn to a forward looking radar system.

Group VI, claim(s) 19-24 and 43-45, drawn to a method of tracking multiple targets.

The inventions listed as Groups I-VI do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

The special technical features of a reflector, transmitter feed, receiver feed and RF module of Group I are not found in Groups II-VI

The special technical feature of a metallic manifold of Group II is not found in Group I or Groups III-VI.

The special technical feature of a plurality of substantially parallel conductive strips of Group III is not found in Groups I, II or III-VI.

The special technical feature of a plurality of monolithic microwave integrated of Group IV is not found in Groups I-III or V-VI.

The special technical feature of a transceiver and processing module coupled thereto of Group V is not found in Groups I-IV or VI

The special technical feature of determining the position and velocity of multiple targets using beat frequencies of Group VI is not found in Groups I-V.